Drinking Water Safety in Newfoundland and Labrador

Happy Valley - Goose Bay Water Treatment Plant

Black Tickle - Domino PWDU Holding Tanks

Wabush Standpipe

Annual Report 2014

Newfoundland Labrador

Environment and Conservation

Drinking Water Safety
in Newfoundland and Labrador

Annual Report
2014

For additional copies, please contact:

Water Resources Management Division
Department of Environment and Conservation
Government of Newfoundland and Labrador
P.O. Box 8700
St. John's NL A1B 4J6
Telephone: (709) 729-2563
Fax: (709) 729-0320

This document is also available electronically at:
http://www.env.gov.nl.ca/env/waterres/reports/index.html#1

Printed on recycled paper

Photo Credits: Courtesy of the Department of Environment and Conservation

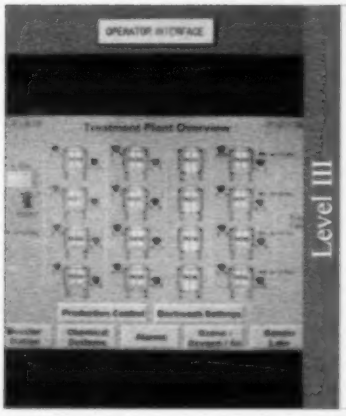
Executive Summary

This is the thirteenth annual report prepared by the Department of Environment and Conservation (ENVC), Government of Newfoundland and Labrador. This report describes the initiatives, activities and accomplishments of the various departments in carrying out the Multi-Barrier Strategic Action Plan (MBSAP) for drinking water safety of public drinking water systems for the 2013–14 fiscal year.

Highlights of MBSAP component indicators for the 2013–14 fiscal year include:

- 314 protected public water supply areas in the province
- 182 land use referrals reviewed for proposed activities concerning protected public water supply areas
- 5 watershed management committees
- 488 disinfection systems, 129 drinking water treatment systems, 17 water treatment plants (WTPs) and 17 potable water dispensing units (PWDUs)
- $10,617,000 approved by the Department of Municipal and Intergovernmental Affairs for water infrastructure projects
- 174 permits to construct for water and sewer infrastructure
- 320 active permits to operate drinking water systems

- 219 active boil water advisories as of March 31, 2014
- 19,642 bacteriological samples and 3,813 chemical and physical water quality samples were collected
- Bacteriological and chemical drinking water quality exceedances recorded (Table 11)
- 1,584 community drinking water quality reports published
- 42 regulatory inspections performed
- 6 education and 135 on-site training seminars conducted by ENVC
- 376 certified water and/or wastewater system operators
- 235 participants at the 2014 Annual Drinking Water Safety Workshop
- Corrective measures undertaken (Table 16)



- Drinking Water Treatment Standards for NL drafted
- Water Treatment Plant Study underway
- Webvideo on Permits to Operate available: *https://www.youtube.com/user/NLWaterResources/feed*
- Study on the Evaluation of Infiltration Galleries in NL

Contents

Executive Summary i

Figures iii

Tables iii

Message from the Minister iv

Introduction 1

Level I 2
- Source Water Protection 2
- Drinking Water Treatment 3
- Drinking Water Distribution 5

Level II 6
- Monitoring 6
- Data Management and Reporting 10
- Inspection and Enforcement 11
- Operator Education, Training, and Certification 11
- Corrective Measures 13

Level III 17
- Legislative and Policy Frameworks 17
- Public Involvement and Awareness 18
- Guidelines, Standards, and Objectives 18
- Research and Development 18

The Path Forward 19
- Department of Environment and Conservation 19
- Department of Health and Community Services 19
- Department of Municipal and Intergovernmental Affairs 20
- Service NL 20

APPENDICES
- Weblinks 21

Figures

Figure 1: The Multi-Barrier Strategic Action Plan 1
Figure 2: Status of Public Water Sources 2
Figure 3: Development Permits by Section 3
Figure 4: Permits Issued per Fiscal Year 3
Figure 5: Chlorination Systems Used in Newfoundland and Labrador 4
Figure 6: Water Treatment Plants per Fiscal Year 4
Figure 7: Number of Permits to Construct per Fiscal Year 5
Figure 8: Bacteriological Samples Tested per Fiscal Year 6
Figure 9: Unsatisfactory Bacteriological Samples per Fiscal Year 7
Figure 10: Number of BWAs and Number of Communities Affected 7
Figure 11: Reasons for BWAs 8

Tables

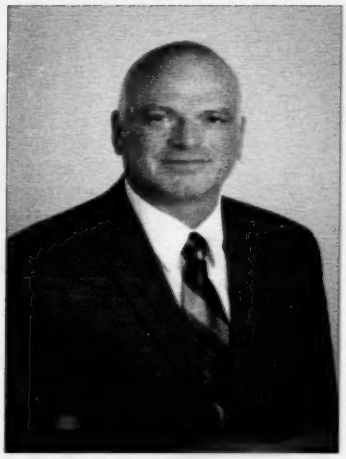
Table 1: Number of Referrals Processed 2
Table 2: Number of Disinfection Systems in Newfoundland and Labrador 4
Table 3: Number of Water Treatment Systems in Newfoundland and Labrador 4
Table 4: Public Water Distribution System Classes for 2013–14 5
Table 5: Funding Approved by Department of Municipal and Intergovernmental Affairs 5
Table 6: Number of Bacteriological Samples Tested in Each Region for 2013–14 6
Table 7: Number of Unsatisfactory Samples for Total Coliforms for 2013–14 6
Table 8: Number of Unsatisfactory Samples for *E. coli* for 2013–14 7
Table 9: Number of Samples Taken by ENVC for 2013–14 8
Table 10: Number of Samples Scheduled and Collected by ENVC for 2013–14 8
Table 11: Exceedances for 2010–11, 2011–12, 2012–13 and 2013–14 Fiscal Years 9
Table 12: Types of Public Reports Produced by ENVC 10
Table 13: Inspections by ENVC for 2013–14 11
Table 14: Total Number of Operator Certificates Issued per Calendar Year 13
Table 15: Number of Communities Employing Certified Operators 13
Table 16: Corrective Measures Undertaken for 2013–14 14

Message from the Minister

As the Minister for the Department of Environment and Conservation, I am pleased to present the annual *Drinking Water Safety in Newfoundland and Labrador* report for 2014. This annual report outlines the accomplishments and activities for 2013–14 under the Multi-Barrier Strategic Action Plan (MBSAP) for the safety of public drinking water systems. The province of Newfoundland and Labrador adopted a Multi-Barrier Strategic Action Plan in 2001 to ensure the safety of drinking water for residents of Newfoundland and Labrador. This strategy is considered to be the most effective method of managing drinking water systems.

The Province's MBSAP incorporates an extensive source water protection program, thorough drinking water quality monitoring program, and data management and reporting programs that protect drinking water. Innovative training opportunities are also provided for operators of drinking water distribution systems, with an emphasis on smaller communities in the province. The Province will work to strengthen these programs by identifying and addressing areas for improvement within each component of the MBSAP.

I commend the hard work of municipal governments in the provision of high quality drinking water to their citizens. I would also like to acknowledge the efforts of the Technical Working Group, which encompasses the Departments of Environment and Conservation, Health and Community Services, Municipal and Intergovernmental Affairs, and Service NL, as well as the province's Regional Health Authorities.



Honourable Dan Crummell
Minister of Environment and Conservation

Introduction

This is the thirteenth annual report on the management of public drinking water systems prepared by the Department of Environment and Conservation (ENVC). This report highlights the initiatives, activities and accomplishments of the departments that implemented the Multi-Barrier Strategic Action Plan (MBSAP) in the 2013–14 fiscal year (April 1, 2013 to March 31, 2014). The report describes the three levels of the MBSAP and their various components (Figure 1). It illustrates how Government is implementing the MBSAP, describes the intended path forward, and plans for future implementation of the MBSAP.

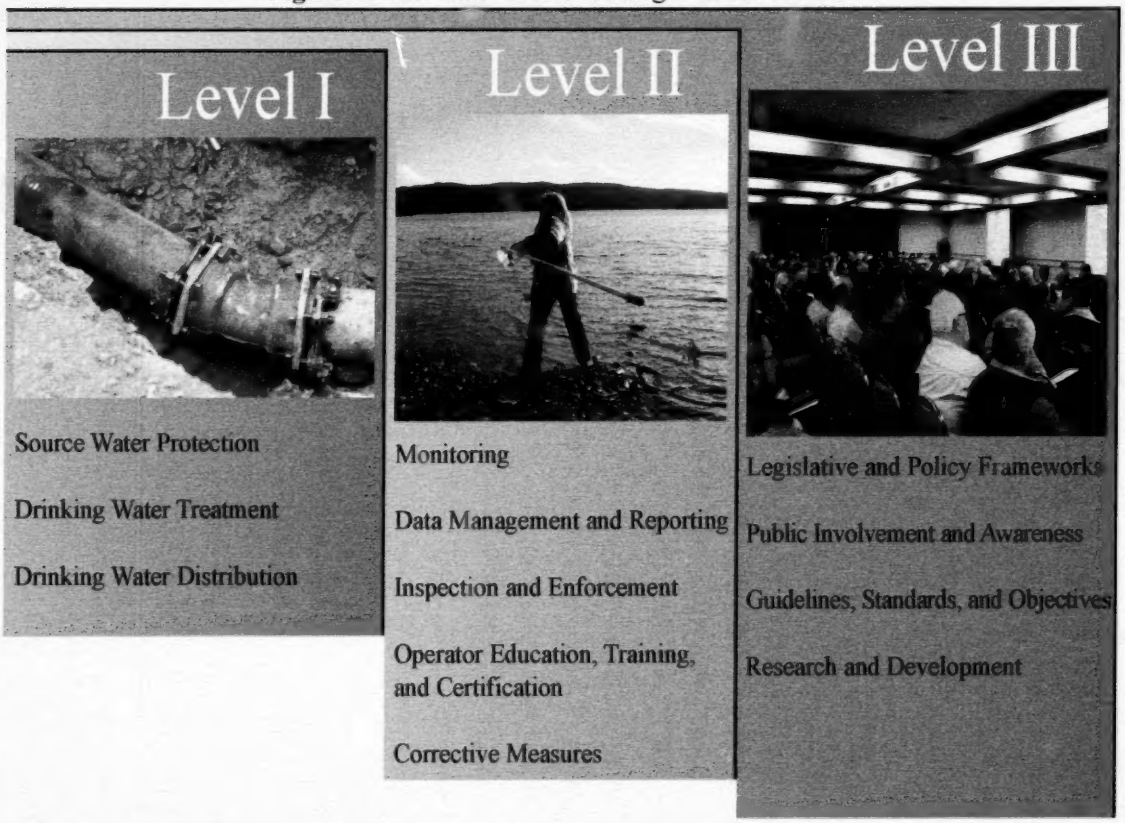
The MBSAP is considered to be the most effective method of managing drinking water systems and has been implemented by other jurisdictions throughout Canada.

The implementation of the MBSAP involves the collaborative efforts of four provincial government departments:

1. Environment and Conservation (acting as the lead agency)
2. Health and Community Services
3. Municipal and Intergovernmental Affairs
4. Service NL

In this report, indicators are reported for various components of the MBSAP. Information is reported for the current fiscal year alongside of previous fiscal years, to evaluate performance of the existing drinking water framework. In addition, illustrations of technical work related to drinking water in this province are highlighted.

Figure 1: The Multi-Barrier Strategic Action Plan



Level I

The components of the first level of the MBSAP protect drinking water from the source to the tap.

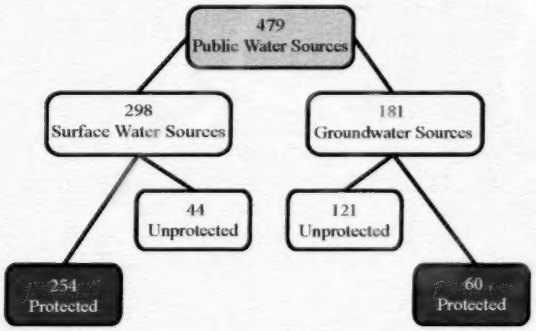
The three components of Level I of the MBSAP are:

1. source water protection
2. drinking water treatment
3. drinking water distribution

Source Water Protection

Protected public water supply areas (PPWSAs) are protected under section 39 of the *Water Resources Act*. These PPWSAs service a population of 373,796, representing 92% of the population serviced by public drinking water systems. Figure 2 shows the status of public water sources for fiscal year 2013–14.

Figure 2: Status of Public Water Sources



The Department of Environment and Conservation encourages all communities to begin the protection process for new or existing drinking water sources if they have not already done so.

Watershed Management

The Water Resources Management Division (WRMD) of the Department of Environment and Conservation regulates development activities within protected public water supply areas. WRMD uses a number of tools to monitor such activities, including:

- referrals from the Interdepartmental Land Use Committee (ILUC), Crown Lands Administrative Division, Natural Resources, Municipal and Intergovernmental Affairs and other agencies (Environmental Assessment (EA))
- permits for development activity
- watershed sensitivity classification system
- watershed management plans
- watershed management committees

Referrals

In the 2013–14 fiscal year, the WRMD processed 182 referrals from various departments for proposed activities concerning PPWSAs as outlined in Table 1.

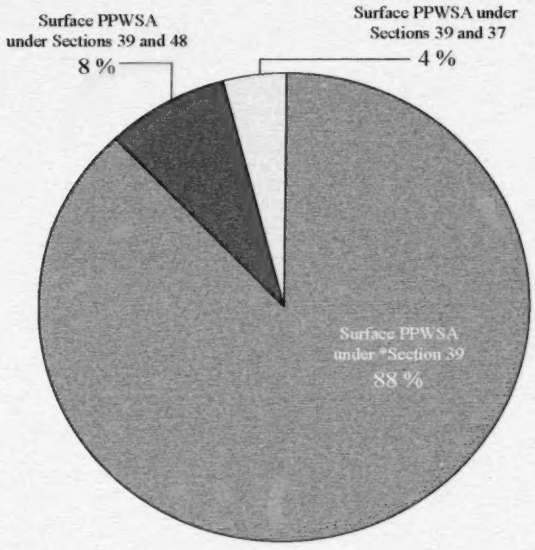
Table 1: Number of Referrals Processed

Type of Referral	Count
Crown Lands Administrative Division	83
Natural Resources	35
Interdepartmental Land Use Committee	32
Municipal and Intergovernmental Affairs	14
Other	18
Total	182

Activity Permits

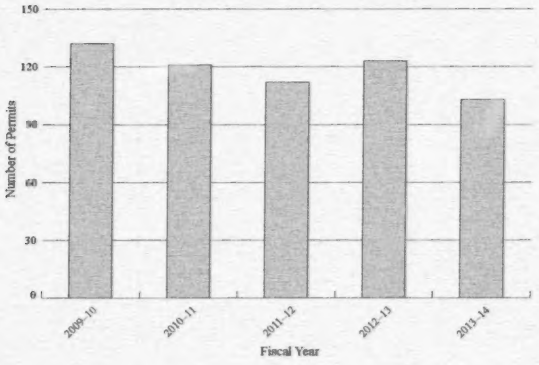
All activities in a PPWSA (either a protected public water supply area, or a wellhead protected water supply area) require a permit. Under the *Water Resources Act* for the 2013–14 fiscal year, 103 development activity permits were issued: Figure 3 illustrates the distribution of development permits by Section. Figure 4 shows the total number of permits issued for development activities within a PPWSA for each fiscal year since 2008–09.

Figure 3: Development Permits by Section



**Section 39 - permits for development in a PPWSA, Section 48 - permits to alter a body of water, Section 37 - permits to construct-waterworks*

Figure 4: Permits Issued per Fiscal Year



Watershed Sensitivity Classification System

The watershed sensitivity classification system was developed to assist the decision making process for development activities within PPWSAs in Newfoundland and Labrador.

The classification system uses a ranking technique that applies a value to various watershed characteristics. Average slope, geographic cover (percentage of watershed covered in forest, water or barrens), and watershed area determine a watershed's potential to be negatively impacted by activities that may impair drinking water quality within a PPWSA. Each characteristic was given a weighted numerical value to calculate an overall score for each PPWSA. Each score is used to rank PPWSAs as low, medium or high sensitivity.

This classification system provides an additional tool to aid WRMD in regulating development activities in PPWSAs, in a consistent method based on their individual characteristics.

Watershed Management Committees

Watershed management committees are formed to oversee land use management, potential development, and resource use conflict inside a PPWSA. Some committees develop watershed management plans (WMP) to oversee the watershed. The active watershed management committees in the province during 2013–14 are located in:

- Clarenville
- Corner Brook (WMP)
- Gander (WMP)
- Grand Falls–Windsor
- Steady Brook (WMP)

Drinking Water Treatment

Several water treatment strategies are used in the province to address different water quality issues to treat the water before it is consumed.

Disinfection

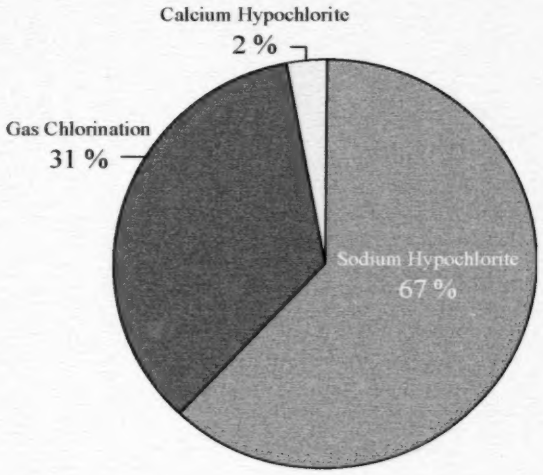
The most critical aspect of water treatment is disinfection. While there are several forms of disinfection used in the treatment of drinking water, chlorination is the most commonly used disinfectant method in the province. The disinfection methods used in the province are outlined in Table 2.

Table 2: Number of Disinfection Systems in Newfoundland and Labrador

Disinfection Systems	Count
Chlorination	441
Ultraviolet Light (UV)	33
Mixed Oxidants	8
Ozone	4
Chloramines	2

Figure 5 illustrates the distribution of different chlorination types in the province during 2013–14.

Figure 5: Chlorination Systems Used in Newfoundland and Labrador



Parameter Specific Drinking Water Treatment

Mitigative measures have been implemented in numerous drinking water systems to alleviate parameter specific water quality challenges. Table 3 shows the number and type of drinking water treatment systems operational in the province as of the 2013–14 fiscal year.

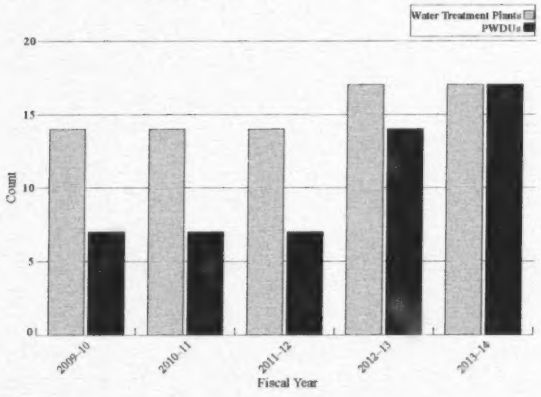
Table 3: Number of Water Treatment Systems in Newfoundland and Labrador

Drinking Water Treatment Systems	Count
pH adjustment	54
Micron/pressure filters	34
Infiltration galleries	24
Arsenic removal	9
Iron/manganese removal	6
Lead removal	1
Strontium removal	1

Water Treatment Plants

As of March 31, 2014, 34 water treatment plants are in place in Newfoundland and Labrador (this number includes 17 potable water dispensing units (PWDUs)). Figure 6 illustrates the total number of water treatment plants in Newfoundland and Labrador for each fiscal year since 2008–09.

Figure 6: Water Treatment Plants per Fiscal Year



Drinking Water Distribution

The drinking water distribution system is the largest component of physical infrastructure that ensures drinking water safety. It includes all the pipes, valves, service lines, pumping stations, fire hydrants, and storage facilities required to deliver clean and safe drinking water.

In the 2013–14 fiscal year there were 521 public water distribution systems in Newfoundland and Labrador. Table 4 shows the breakdown of the number of water distribution systems in the province for 2013–14. Sixty-nine percent of public water distribution systems in Newfoundland and Labrador fall into the "very small" classification, as they serve populations of 500 or fewer people.

Table 4: Public Water Distribution System Classes for 2013–14

Water Distribution System	Population	Count
Very Large	> 50,000	1
Large	15,001- 50,000	2
Medium	1,501 - 15,000	41
Small	501 - 1,500	82
Very Small	≤ 500	358
Unknown	variable	37
Total		521

During the 2013–14 fiscal year, the Department of Municipal and Intergovernmental Affairs approved $10,617,000 for water related projects. Table 5 provides a breakdown of initiatives for the April 1, 2013 to March 31, 2014 fiscal year. The Provincial Government share less GST amounts are shown.

During the 2013–14 fiscal year, the Department of Environment and Conservation issued 133 permits to construct water and sewer infrastructure under Sections 36 & 37 of the *Water Resources Act*. Figure 7 shows the number of permits to construct issued for each fiscal year since 2009–10.

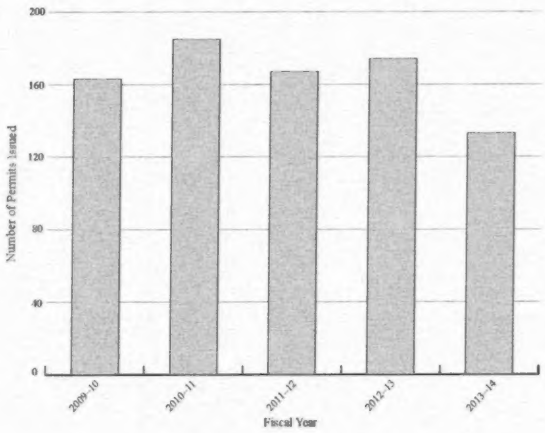
Table 5: Funding Approved by Department of Municipal and Intergovernmental Affairs

Category	*Funding ($)
New Water Distribution	2,220,000
Upgrades to Water Distribution	5,370,000
New Drinking Water Treatment/ **DWSI/PWDU	1,700,000
Upgrades to Drinking Water Treatment	1,227,000
Studies	100,000
Total	10,617,000

**Provincial share less GST amounts shown*
***Drinking Water Safety Initiative/Potable Water Dispensing Units.*

In the 2013–14 fiscal year, the Department issued eight permits to operate. The total number of active permits to operate for drinking water systems at the end of the 2013–14 fiscal year was 320.

Figure 7: Number of Permits to Construct per Fiscal Year



Level II

The standard of performance achieved in Level I of the MBSAP is verified through the components of Level II.

The five components in Level II of the MBSAP are:

1. monitoring
2. data management and reporting
3. inspection and enforcement
4. operator education, training, and certification
5. corrective measures

Monitoring

Drinking water quality monitoring consists of regular sampling and testing of drinking water from both the source and the tap. The extensive monitoring program for drinking water quality in the province is a joint responsibility shared by the Departments of Environment and Conservation, Health and Community Services, and Service NL.

Bacteriological and Chemical Water Quality

Bacteriological Water Quality

Under the direction of Service NL, Environmental Health Officers and Environmental Technicians collect tap water samples from public drinking water supplies for analysis of bacteriological parameters. The parameters monitored include total coliforms and *Escherichia coli* (*E. coli*). During the 2013–14 fiscal year, 19,642 public water supply bacteriological samples were collected and tested. Figure 8 shows the total number of bacteriological samples that were collected and tested for each fiscal year since 2009–10.

The number of bacteriological samples tested at each regional drinking water testing facility is shown in Table 6.

Figure 8: Bacteriological Samples Tested per Fiscal Year

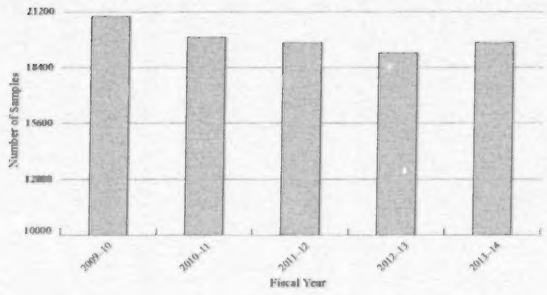


Table 6: Number of Bacteriological Samples Tested in Each Region for 2013–14

Region sampled	Count
St. John's Region	8,570
Western Region	4,332
Central Region	3,845
Northern Region	1,699
Eastern Region	1,196
Total	19,642

Bacteriological Parameters: Results

Based on the analysis of bacteriological parameters for public drinking water samples taken during the 2013–14 fiscal year, 962 public water supply samples tested were found to be unsatisfactory in terms of total coliforms. Table 7 shows the number of samples found to be unsatisfactory for total coliforms, at each regional drinking water testing facility, for the fiscal year 2013–14.

Table 7: Number of Unsatisfactory Samples for Total Coliforms for 2013–14

Region Tested for Total Coliforms	Samples
St. John's Region	250
Western Region	318
Central Region	162
Northern Region	162
Eastern Region	70
Total	962

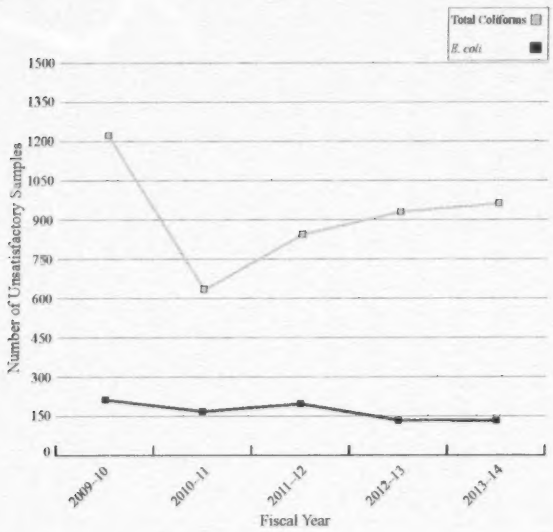
There were 132 bacteriological samples tested that were found to be unsatisfactory in terms of *E. coli**. Table 8 shows the number of samples found to be unsatisfactory for *E. coli.*, at each regional drinking water testing facility, for the fiscal year 2013–14.

Table 8: Number of Unsatisfactory Samples for *E. coli* for 2013–14

Region Tested for *E. coli*	Unsatisfactory Samples
St. John's Region	41
Western Region	44
Central Region	24
Northern Region	12
Eastern Region	11
Total	132

The number of unsatisfactory samples for total coliforms and *E. coli* for each fiscal year since 2008–09 is shown in Figure 9.

Figure 9: Unsatisfactory Bacteriological Samples per Fiscal Year



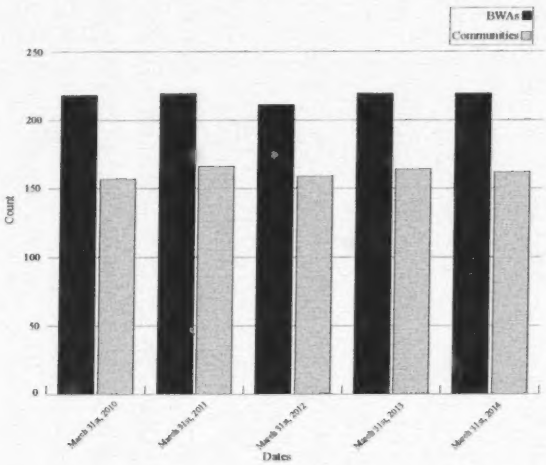
**Escherichia coli (E. coli) is considered a good indicator of recent fecal contamination of drinking water and the possible presence of disease causing microorganisms.*

Boil Water Advisories

Boil water advisories (BWAs) are preventative measures for protecting public health from waterborne microbiological contamination that may, or are known to be, present in drinking water. A BWA is also issued when water quality is questionable due to operational deficiencies (such as inadequate chlorine residual), no disinfection system, or the water in a community's water system is contaminated with bacteriological indicators (such as total coliforms).

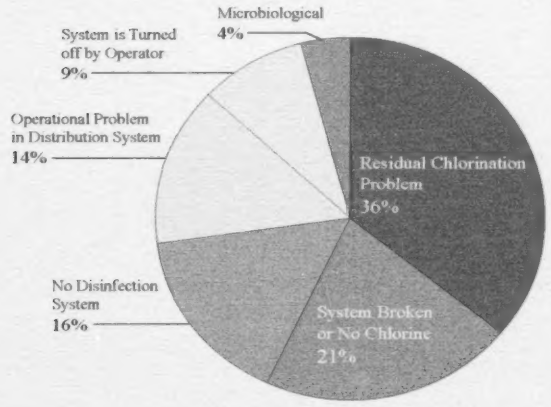
When discussing BWAs for the purpose of this annual report, it is referring to BWAs in effect at the end of the fiscal year, March 31, 2014. Figure 10 shows a historical comparison of BWAs at the end of each fiscal year since March 31, 2010.

Figure 10: Number of BWAs and Number of Communities Affected



On March 31, 2014, 219 BWAs were in effect (this includes long-term BWAs), affecting 162 communities in the province, with an impacted population of 48,920. Figure 11 illustrates the distribution of existing BWAs by reason used to issue the advisory for the 2013–14 fiscal year.

Figure 11: Reasons for BWAs



Long term BWAs are BWAs that have been in effect for a period of five years or greater at the end of the 2013 calendar year. A total of 123 BWAs have been in effect for a period of five years or greater.

Chemical and Physical Water Quality

The number of chemical and physical water quality samples taken per region for 2013–14 are presented in Table 9. Analysis of chemical and physical parameters is performed by an accredited lab ensuring that the laboratory provides quality and competency in its sample analysis.

Table 9: Number of Samples Taken by ENVC for 2013–14

Region	Source	Tap	THM	HAA	Total
Eastern	88	449	469	469	1475
Western	29	343	395	395	1162
Central	32	204	337	337	910
Labrador	12	62	93	93	260
Other (special)	5	1	0	0	6
Totals	166	1,059	1,294	1,294	3,813

In 2013–14, the Department of Environment and Conservation collected 3,813 samples. Additional samples may also be taken for communities due to community concerns, special monitoring programs or water quality studies for chemical parameters from public water supplies. Ninety-six percent of the samples that were scheduled for this fiscal year were collected. Table 10 shows the number of samples scheduled and the number actually taken for 2013–14.

Table 10: Number of Samples Scheduled and Collected by ENVC for 2013–14

Type of Sample	Scheduled	Collected	Percent
Tap Water Sample	1,077	1,059	98
THM Water Sample	1,336	1,294	97
HAA Water Sample	1,336	1,294	97
Source Water Sample	230	166	72
Total	3,979	3,813	96

The reasons that some samples were not taken are as follows:

- safety (source samples)
- town was not chlorinating at the time of sampling (THM and HAA samples)
- water supply not operating at the time of sampling (tap, THM and HAA samples)
- no sample location available at the time of sampling (very small systems)

Chemical and Physical Parameters: Results

Results for chemical and physical parameters are sent to the Department of Environment and Conservation when laboratory analysis is complete. The department then evaluates the results by comparing them to current *Guidelines for Canadian Drinking Water Quality* (GCDWQ). Water quality results are compared to the GCDWQ to identify exceedances in chemical and physical parameters that may pose a risk to human health or aesthetic approval of drinking water.

Table 11 summarizes the tap water bacteriological, chemical and physical parameter exceedances for the 2010–11, 2011–12, 2012–13 and 2013–14 fiscal years.

Table 11: Exceedances for 2010–11, 2011–12, 2012–13, and 2013–14 Fiscal Years

Department	Exceedances					
	Parameters		2010–11	2011–12	2012–13	2013–14
Service NL	Bacteriological	*Escherichia coli*	167	196	133	132
		Total coliforms	633	844	930	962
Environment and Conservation	Chemical and Physical	Turbidity	106	98	103	78
		Arsenic	5	4	4	13
		Barium	1	2	1	2
		Fluoride	2	0	1	0
		Lead	2	8	4	2
	Disinfection By-Products	Trihalomethanes (THMs)	126	129	132	117
		Haloacetic Acids (HAAs)	157	165	147	153
	Aesthetic	Colour	488	514	433	466
		pH	235	361	335	368
		Total Dissolved Solids	17	11	17	19
		Chloride	5	3	6	5
		Sodium	2	3	4	3
		Sulphate	4	3	2	2
		Copper	6	11	1	5
		Iron	91	107	113	127
		Manganese	70	83	106	102

When an exceedance is confirmed for a parameter that may pose risk to human health, an exceedance report is sent immediately to the community, Departments of Health and Community Services, Municipal and Intergovernmental Affairs and Service NL. Exceedances for aesthetic parameters are also reported to communities, along with all other parameter results, in quarterly drinking water quality reports. Communities and the public can access this drinking water quality data through the WRMD's Water Resources Portal online at: *http://maps.gov.nl.ca/water/*. The WRMD's sampling and reporting procedures are outlined in the *Drinking Water Quality Monitoring Manual*, which can be viewed online at: *http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/manual.html*.

Data Management and Reporting

The large volume of data acquired during the implementation of the various components of the MBSAP must undergo a stringent quality assurance/quality control (QA/QC) process before it can be compiled, analyzed, and reported to the public. The WRMD strives to collect quality data and report it to the public in an open and timely manner.

Table 12 summarizes the reports used to communicate the results from programs related to drinking water quality.

Table 12: Types of Public Reports Produced by ENVC

Type	Description
Seasonal Community Drinking Water Quality Reports	All communities with public drinking water systems are provided with an interpreted report if seasonal monitoring has been conducted. These reports clearly indicate any parameters that exceed the *Guidelines for Canadian Drinking Water Quality*. The province recommends that communities post these reports in public locations. In the 2013–14 fiscal year, 1,584 seasonal community reports were mailed out.
Exceedance Reports	Exceedance reports are provided to communities when a laboratory result is above the *Guidelines for Canadian Drinking Water Quality* for contaminant parameters. These reports are faxed and/or mailed to the affected community as soon as the department receives the results. In the 2013–14 fiscal year, nine exceedance reports were sent out to communities.
Annual Drinking Water Safety in Newfoundland and Labrador Report	The Annual Drinking Water Safety in Newfoundland and Labrador Report has been published each year since 2001. It outlines accomplishments and activities under the Multi-Barrier Strategic Action Plan for drinking water safety in a particular fiscal year.
Web Documents on Drinking Water Quality	The WRMD's website is an important tool used to communicate with the public. It is updated regularly with new information on drinking water quality and related topics. The "What's New" screen, lists the most current information and is online at: *http://www.env.gov.nl.ca/env/waterres/whatsnew/index.html*

Inspection and Enforcement

The *Water Resources Act* states that a permit holder shall allow inspectors to carry out inspections of an activity for which a license or permit has been issued. Investigations can also occur once the Department of Environment and Conservation is made aware of a contravention of the *Water Resources Act* or associated regulations and permits. Departmental staff conduct inspections of water supply systems under construction, the operation of water treatment and distribution systems, groundwater wells being drilled, and activities taking place in PPWSAs to ensure that they comply with the terms and conditions of the permit. Communities should conduct routine surveillance and monitoring for approved development activities within PPWSAs to ensure these existing activities are being conducted in an environmentally acceptable manner and to ensure that there are no development activities taking place without prior approval from the department. Investigations are typically issue-specific.

In the 2013–14 fiscal year, departmental staff carried out a total of 62 inspections/ investigations. In addition, staff visited public water supplies two to four times a year during scheduled monitoring work. Table 13 presents a breakdown of inspections for 2013–14.

Table 13: Inspections by ENVC for 2013–14

Inspection Type	Count
Water and Sewer Construction	21
Protected Surface Water Supplies	13
Water System Operation	8
Protected Groundwater Supplies	20
Total	62

One of ENVC's main goals is to ensure communities achieve clean and safe drinking water in a sustainable and efficient manner. When non-compliance with the conditions of a permit is reported, WRMD responds to enforce the permit.

Operator Education, Training, and Certification

Certified operators are integral to the proper operation and maintenance of the systems that supply clean and safe drinking water to the consumer. Through continuing education, training, and certification, the Department of Environment and Conservation addresses the need for qualified drinking water treatment and distribution system operators in this province.

During the 2013–14 fiscal year, six drinking water related classroom seminars were held at three locations across the province.

Operator Training

The operator training program provides municipal drinking water system operators with hands-on training opportunities. The program utilizes three mobile training units (MTUs) that have been equipped with various equipment and tools used in the operation and maintenance of drinking water systems. Training sessions are delivered on-site in the operator's community to maximize accessibility to the training opportunities. During 2013–14, the province's three operator trainers conducted 135 on-site training sessions throughout the province. These sessions were attended by a total of 216 participants.

Special Source Water Quality Monitoring in Response to Possible Contamination Incidents

ENVC has scheduled and collected thousands of samples from drinking water sources in Newfoundland and Labrador. The sample results are stored in a database and compiled as baseline data for individual drinking water sources in the province. The data can be used to determine the quality of water that flows into a drinking water treatment and/or distribution system. The water quality from a source is a direct indicator of the health of the ecosystem that makes up the natural drainage basin or groundwater recharge area and allows one to assess the impact of land use changes on source water and to ensure the integrity of a public water supply.

Occasionally additional source water quality monitoring, beyond the regular scheduled monitoring, is necessary. Two recent examples of such instances took place in the communities of Wabush and Churchill Falls.

In June of 2013, Wahnahnish Lake, source of drinking water for the community of Wabush, was used for water collection by a water bomber during a state of emergency as forest fires raged only kilometres away. As a precaution, ENVC initiated a water quality monitoring program for Wahnahnish Lake and the community of Wabush that included organic, inorganic and physical parameter sampling for source water and tap water each week for a period of six weeks. The purpose of this monitoring was to ensure that the fire suppression activities did not impair the drinking water quality for the community. Sample results were found to be consistent with the baseline data for this drinking water supply. No further action was required to protect the drinking water quality for this community.

In August of 2013, a hydroseed application company, while trying to unclog a pump in their sprayer truck, allowed a small amount of the hydroseed slurry to wash directly into the Churchill Falls reservoir. Although hydroseed mixture is not considered a toxic substance it is not intended to be added directly to water and can cause negative environmental effects such as algae overgrowth, decreased water quality, and in severe cases, fish kills. A three month water quality monitoring program of both source water and tap water sampling was initiated. The sample results indicated elevated levels of some major nutrients such as phosphorus and nitrogen, however no long-term negative effects were observed through the sampling program. These nutrient levels eventually returned to levels consistent with the baseline data for both source and tap water.

For more information on drinking water quality monitoring in Newfoundland and Labrador, please visit the Water Resources Management Division website at *http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/chemical.html*. All drinking water monitoring data is available online via the Newfoundland and Labrador Water Resources Portal at: *http://www.env.gov.nl.ca/env/waterres/portal.html.*

Operator Certification

Certification is an essential component for the operation of a safe drinking water system.

There are 376 certified water and/or wastewater operators in Newfoundland and Labrador. Fifty-five operators achieved their first level of certification in the calendar year 2013. Table 14 contains the total number of operator certificates issued per calendar year by classification.

Table 14: Total Number of Operator Certificates Issued per Calendar Year

Calendar Year	2010	2011	2012	2013	2014
Water Distribution	80	15	58	19	19
Water Treatment	7	13	26	22	22
Wastewater Collection	15	13	10	24	25
Wastewater Treatment	4	29	1	8	8
Total Certificates	106	70	95	73	74

Table 15 summarizes the number of communities in Newfoundland and Labrador that employ at least one certified operator divided by classification.

Table 15: Number of Communities Employing Certified Operators

Certification Classification	Number of Communities
Water Distribution	97
Water Treatment	17
Wastewater Collection	49
Wastewater Treatment	11

**The above numbers do not include industrial facilities that employ certified operators - only municipalities.*

Annual Clean and Safe Drinking Water Workshop

The Annual Clean and Safe Drinking Water Workshop is open to all community operators and administrators. It brings together drinking water quality stakeholders and provides them with opportunities to learn about drinking water safety, to exchange information, and to share experiences. The presentations delivered throughout this event are carefully chosen to address specific challenges faced by small communities in providing clean and safe drinking water.

The 2014 Clean and Safe Drinking Water Workshop took place on March 25 - 27, 2014 in Gander. The workshop attracted 235 participants from across the province and country. A travel subsidy is provided by the Department of Municipal and Intergovernmental Affairs to attend the workshop. Communities from the island portion of the province that were approved for the subsidy were reimbursed up to $400, and communities from Labrador that were approved for the subsidy were reimbursed up to $700. The next Annual Clean and Safe Drinking Water Workshop is scheduled for March 24 - 26, 2015.

Corrective Measures

The Level II components of the MBSAP just discussed, provide an ongoing picture of drinking water supply, quality, and infrastructure. The issues identified require the implementation of corrective actions to deal with these challenges. Corrective measures can include structural, non-structural, operational techniques and other best management practices.

There are five classes of corrective measures: policy, design, water system management, water treatment alternatives, and source alternatives. Table 16 shows the progress made in each category of corrective measures.

Table 16: Corrective Measures Undertaken for 2013–14

Corrective Measure	Description
Policy	• Year 13 of the Multi-Barrier Strategic Action Plan for Safe Drinking Water in NL • Update of the Bacteriological Standards to the Drinking Water Treatment Standard for NL drafted • The Interdepartmental Safe Drinking Water Technical Working Group met 6 times • Revised definition of a Public Drinking Water System drafted
Design	• Updating the *Newfoundland and Labrador Guidelines for the Design, Construction and Operation of Water and Sewerage Systems* to the *Newfoundland and Labraador Guidelines for the Design of Drinking Water Systems* underway • Study on the Evaluation of Infiltration Galleries in NL
Water System Management	• Ongoing operator education, training and certification • Permits to Construct issued relating to water system management: o Water main upgrades and replacement– 22 o New or upgraded pumps or pumphouse– 2 o New tanks or upgrades to tanks– 2 o New contact tanks or pipe– 2 o New or upgraded valves– 4 o New or upgraded flow meter– 2 o New sampling taps– 1 • Two community assessments undertaken in response to drinking water quality issues • Six Permit to Operate Drinking Water Inspection Reports and Inspection Risk Ratings issued
Water Treatment Alternatives	• Permits to Construct issued relating to water treatment: o New chlorination systems– 2 o Chlorination system upgrades– 1 o New Fe/Mn removal system– 1 o New filtration systems– 1 o New PWDUs– 1 o Water treatment plant upgrades– 1 • Study on NL water treatment plants underway
Source Alternatives	• Permits to Construct issued relating to water sources: o New wells– 2 o New or upgraded intake or screenhouse– 3 • Twenty public wellhead inspections undertaken

2014 Operator of the Year Awards

The Department of Environment and Conservation created the Operator of the Year Awards to recognize the outstanding dedication of municipal operators in providing clean and safe drinking water. Community representatives across the province were invited to nominate an operator they felt had made an outstanding contribution. In total, 32 nominations were submitted to the selection committee for consideration in two categories: Volunteer Operator of the Year and Operator of the Year.

The Volunteer Operator of the Year Award was created to honour an individual that operates a municipal drinking water system without any monetary compensation. The 2014 Award was presented to Mr. Darrell Payne from the Local Service District of Deep Bight. Mr. Payne has been a volunteer with the community for 3 years and has served as Vice-Chair of the LSD during that time. In addition he has volunteered his time to operate and maintain the groundwater system to provide drinking water to the residents of Deep Bight. Darrell has faced many challenges in his role as water system operator but is committed to facing these challenges and fully understanding the operations of the drinking water system.

The 2014 Operator of the Year Award was presented to Mr. Ernest (Ernie) Drover, Town of Pasadena. Mr. Drover has been responsible for operating the town's drinking water systems since 2004. Since that time, he has achieved certification in Water Distribution, water Treatment, Wastewater Collection, and Wastewater Treatment. In addition to his regular duties as a water and wastewater system operator, Ernie has developed a model-sized water treatment and distribution system that he uses to educate interested individuals and groups within the community. Mr. Drover is a proficient and professional operator who is committed to ensuring the residents of Pasadena receive clean and safe drinking water.

Mr. Darrell Payne, recipient of the 2014 Volunteer Operator of the Year Award

Mr. Ernest Drover, (left) recipient of the 2014 Operator of the Year Award being presented by Mr. Jamie Chippett Deputy Minister of ENVC

Working with Industry for a Better Tomorrow

The forestry sector is an important resource for the Province of Newfoundland and Labrador. Corner Brook Pulp and Paper Limited (CBPP) have been involved in the forest industry in western Newfoundland for over 90 years and manage approximately 1.5 million hectares of forest land. Some of this land falls into our province's Protected Public Water Supply Areas (PPWSAs).

Management of forestry activities within PPWSAs involves an integrated approach where environmental, economic, and social priorities are balanced. One key aspect of the planning process for CBPP involves public input and participation through a Public Advisory Committee (PAC). The PAC provides input into the Company's Sustainable Forest Management Plan and currently consists of approximately 30 members. The members represent a wide spectrum of industry stakeholders, from private citizens, towns, and non-profit groups to government and harvesting contractors.

To demonstrate their commitment to sustainable forest management, CBPP hosted a field trip to the Steady Brook PPWSA (March 14th 2014) where they have been conducting harvesting activities since 2006. The Watershed Management Plan for the Town of Steady Brook was completed in 2005. Participants included members of PAC and the Steady Brook Watershed Management Committee. The day was filled with a great deal of information, informal presentations, discussions, and harvesting equipment demonstrations. A temporary water crossing structure was visited and description of how a winter forestry road is constructed added to the field experience.

Sustainable harvesting in the Steady Brook PPWSA is a great example of how government, the public, and industry can work together to safeguard our water resources for future generations.

CBPP field trip participants

Level III

The management of drinking water depends on the contribution of several levels of government as well as the public.

The four components in Level III of the MBSAP are:

1. legislative and policy frameworks
2. public involvement and awareness
3. guidelines, standards and objectives
4. research and development

Legislative and Policy Frameworks

The legislation that governs public drinking water systems in the province includes the *Water Resources Act*, the *Municipal Affairs Act*, and the *Municipalities Act*. All of the legislation, policy directives, standards, and regulations are posted on the province's website. These three Acts contain broadly stated initiatives:

- the *Water Resources Act* regulates the administration of water rights, the protection of public water supply areas, and a range of construction and development permits pertaining to drinking water infrastructure and development that may impact public water supplies
- the *Municipal Affairs Act* administers the management of waterworks
- the *Municipalities Act* grants powers to municipalities for the construction, operation, and maintenance of water systems and for the allocation of funds for this work

Government also introduces regulations, guidelines and policy directives to provide more explicit direction for legislation.

Interdepartmental Cooperation

The Provincial Government's efforts to provide clean and safe drinking water are the result of the combined contributions of four departments: the Department of Environment and Conservation (acting as the lead agency), Health and Community Services, Municipal and Intergovernmental Affairs, and Service NL. Each department is responsible for one or more components of the MBSAP. Their efforts are coordinated by an interdepartmental committee of deputy ministers, which is chaired by the Deputy Minister of the Department of Environment and Conservation. The committee's work is supported by the Interdepartmental Safe Drinking Water Technical Working Group, which was formed in June 2000. The working group is chaired by the Director of the Department of Environment and Conservation, and includes representatives from the Departments of Health and Community Services, Municipal and Intergovernmental Affairs, and Service NL. Medical Officers of Health and representatives from the Public Health Laboratory are also members of the working group. The working group met six times in 2013–14, with all activities reported to senior government officials. The working group leads work on the development of policy and guidelines relating to drinking water safety.

In 2013–14, the working group focused on the QA/QC of BWAs, and the implementation of the MBSAP for drinking water safety in Newfoundland and Labrador.

Public Involvement and Awareness

The Department of Environment and Conservation continues to provide accessible and timely drinking water quality information to the public. The department's website is a major tool for increasing public awareness and encouraging public involvement. Watershed management committees are another way the public can participate in efforts to ensure clean and safe drinking water supplies. They are excellent forums in which stakeholders can voice opinions and concerns about land management and water quality issues in their watershed areas. The establishment of watershed management committees furthers the Department of Environment and Conservation's goal of increasing public involvement and awareness of drinking water safety issues.

Videos for the following drinking water related topics can be found on the NL Water Resources channel at *https://www.youtube.com/user/NLWaterResources/feed*:

- A video addressing common questions relating to Permits to Construct water and sewer infrastructure in Newfoundland and Labrador
- A video explaining how to find information on public drinking water systems in Newfoundland and Labrador
- A video addressing common questions relating to Permits to Operate for water and sewer infrastructure in Newfoundland and Labrador

Guidelines, Standards and Objectives

To ensure clean and safe drinking water, the Department of Environment and Conservation sets drinking water safety guidelines, standards, and objectives, and regularly reviews and updates them to address current issues and challenges. Guidelines, standards and objectives currently available on our website, *http://www.env.gov.nl.ca/env/waterres/regulations/index.html*, include:

- *Bacteriological Quality of Drinking Water*
- *Standards for Chemical and Physical Monitoring*
- *Guidelines for the Design, Construction and Operation of Water and Sewerage Systems*
- *Chlorination Equipment Selection Guidelines*
- *Best Management Practices for the Control of Disinfection by-Products in Drinking Water Systems in Newfoundland and Labrador*
- *Guidelines for Disinfecting Dug and Drilled Wells*
- *Guidelines for Sealing Groundwater Wells*
- *Selection Criteria and Guidelines for the Design, Construction and Operation of Potable Water Dispensing Units*

Research and Development

In order to stay on top of current and emerging issues that affect drinking water safety, the Department of Environment and Conservation undertakes several research and development activities each year. Studies completed or underway in 2013–14 include:

- *Evaluation of NL Water Treatment Plants*
- *Evaluation of Infiltration Galleries in NL*

The Path Forward

Department of Environment and Conservation

The Department of Environment and Conservation will continue to pursue its commitment to develop and strengthen all levels and components of the Multi-Barrier Strategic Action Plan.

The department's drinking water monitoring activities for the 2014–15 fiscal year are planned as follows:

- 3,795 drinking water quality samples scheduled for collection and analysis
- 92 source water samples, to be analyzed for inorganic chemical parameters
- 1,085 tap water samples, to be analyzed for inorganic chemical parameters
- 1,309 tap water samples, to be analyzed for trihalomethanes
- 1,309 tap water samples, to be analyzed for haloacetic acids

The Department will continue to provide education and hands-on training opportunities to water system operators. The 2015 Clean and Safe Drinking Water Workshop is scheduled for March 24- 26, 2015 in Gander. The Department looks forward to sharing information and experiences with the various stakeholders involved in providing clean and safe drinking water to the people of the province.

Proposed new Drinking Water Treatment Standards for NL, to replace existing *Standards for Bacteriological Quality of Drinking Water*, are expected to be approved in 2014–15. These new standards will establish minimum requirements for drinking water treatment that apply to all public drinking water systems in NL.

Department of Health and Community Services

Through the Newfoundland and Labrador Public Health Laboratory and regional drinking water testing locations, water samples from municipal and private supplies are tested for the bacteriological indicators *E. coli* and total coliform bacteria.

In 2014–15 the Department of Health and Community Services and the four Regional Health Authorities will continue with their drinking water safety initiatives by working collaboratively with provincial and municipal partners to maintain, and enhance where possible, drinking water related health protection efforts and disease prevention initiatives.

Key areas of focus are to:

- Provide policy and technical support to Environmental Technicians and Environmental Health Officers with Service NL who perform bacteriological water quality monitoring, interpret bacteriological water quality test results and issue boil water advisories.
- Review boil water advisory guidelines, and revise where necessary.
- Review drinking water safety promotional materials, and revise where necessary. Drinking water awareness information is available online at: *http://www.health.gov.nl.ca/health/publichealth/envhealth/drinkingwater.html.*
- Provide health-related advice to municipal leaders and residents when unsatisfactory water quality in public water supplies is identified.
- Continue to provide regional bacteriological water quality testing services as part of Government's bacteriological water quality monitoring program.

Department of Municipal and Intergovernmental Affairs

The Department of Municipal and Intergovernmental Affairs will continue to financially support requests from communities for the provision of water related infrastructure as well as provide implementation oversight. Cost effective approaches with regard to regionalization of operational and maintenance services also will be encouraged in the way of both advisory and financial support. Appropriate water treatment technology to enable communities to meet the *Guidelines for Canadian Drinking Water Quality* continues to be a priority for capital funding assistance. In this regard, the Department supports the Provincial Government's Rural Drinking Water Safety Initiative by providing residents of small communities with access to high quality drinking water through the construction of potable water dispensing units. As a result, three systems were made operational and construction progressed on eight other systems in 2013–14. These water kiosks are small-scale water treatment systems which pump and treat water from the municipal supply, store the treated water and allow residents to manually collect the water from a small shelter.

Service NL

Through its bacteriological water monitoring program, Service NL helps ensure that public drinking water is protected from waterborne diseases and is safe for consumption. Its ongoing high level of public water sample collection is an indication of the Department's commitment to a satisfactory level of bacteriological water monitoring and compliance with levels recommended in the province's standards and the *Guidelines for Canadian Drinking Water Quality*.

The Department's six Environmental Technicians are front-line staff with a primary role in the collection and submission of municipal water samples. Environmental Health Officers undertake the essential interpretation of the test results and notification of any issues regarding adverse reports to communities. These efforts are key in helping to secure the safety of the province's public drinking water supplies.

Service NL will also continue to partner with the Department of Health and Community Services and the Regional Health Authorities on water quality issues. It is important to ensure that Environmental Technicians and Environmental Health Officers have access to on-going professional development, including bacteriological water monitoring. Support for professional development in this area will continue.

Weblinks:

Department of Environment and Conservation
http://www.env.gov.nl.ca/env/index.html

Newfoundland and Labrador *Water Resources Act* SNL 2002 cW-4.01
http://www.assembly.nl.ca/Legislation/sr/statutes/w04-01.htm

Water Resources Management Division Reports and Publications
http://www.env.gov.nl.ca/env/waterres/reports/index.html

Newfoundland and Labrador Water Resources Portal
http://maps.gov.nl.ca/water/

Protected Water Supply Area List and GIS Layers
http://www.env.gov.nl.ca/env/waterres/gis/index.html

Guidelines for Canadian Drinking Water Quality: Summary Table
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php

Standards for Bacteriological Quality of Drinking Water
http://www.env.gov.nl.ca/env/waterres/regulations/policies/standards_microbiological.html

Standards for Chemical and Physical Monitoring of Drinking Water
http://www.env.gov.nl.ca/env/waterres/regulations/policies/physical_monitoring.html

Policy for Drinking Water Quality Monitoring and Reporting for Public Water Supplies
http://www.env.gov.nl.ca/env/waterres/regulations/policies/water_quality.html

Department of Environment and Conservation Drinking Water Quality Data
http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/chemical.html

Acts, Regulations, Policy Directives, and Water Quality Standards
http://www.env.gov.nl.ca/env/waterres/regulations/policies/index.html

Operator Education, Training, and Certification
http://www.env.gov.nl.ca/env/waterres/training/index.html

Guidelines for the Design, Construction, and Operation of Water and Sewerage Systems
http://www.env.gov.nl.ca/env/waterres/waste/groundwater/report.html

Best Management Practices for the Control of Disinfection By-products in Drinking Water Systems in Newfoundland and Labrador
http://www.env.gov.nl.ca/env/waterres/reports/cwws/index.html

Water Resources Management Division
Department of Environment and Conservation
Government of Newfoundland and Labrador
P.O. Box 8700, St. John's, NL
A1B 4J6

Newfoundland
Labrador

Environment and Conservation